

Appl. No. 10/613,563
Amdt. dated January 4, 2006
Reply to Office action of October 4, 2005

REMARKS

Reconsideration is respectfully requested. Claims 1-15 are present in the application. Claim 1 is amended. Claims 5-6 are canceled. No other claims are amended herein.

Some obvious typographic errors are in the Official Action. In point 1 on Page 2 of the Official Action, the recited law should be 35 U.S.C. 102(b), not 103(a). In point 2 of the rejections on Page 3, US patent 5360465 was granted to Richard F. Buchholz et al. instead of Fischbein et al. (This error also appears in the previous Official Action.) Line 10 on page 3 of this Official Action points out that "See col. 37-44 therefore" The content of US 5,360,465 only has 8 columns in total, and no col. 37-44 appears in this patent. The applicant is confused about the Examiner's allegation and wonders if the Examiner is referring to some other document.

Claims 1, 3, 5, 7-10, 12 and 14 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Detroit (U.S. 4846871 or 5041153). Applicants respectfully traverse.

Claims 1, 3, 5, 7-10, 12 and 14 are allowable under U.S.C. §102(b) over Detroit (US patent 4846871 or 5041153).

The Applicant's invention relates to a method for making controlled release ammonium phosphate fertilizer, which comprises the; steps of:

- adding release-controlling materials to ammonium phosphate slurry;

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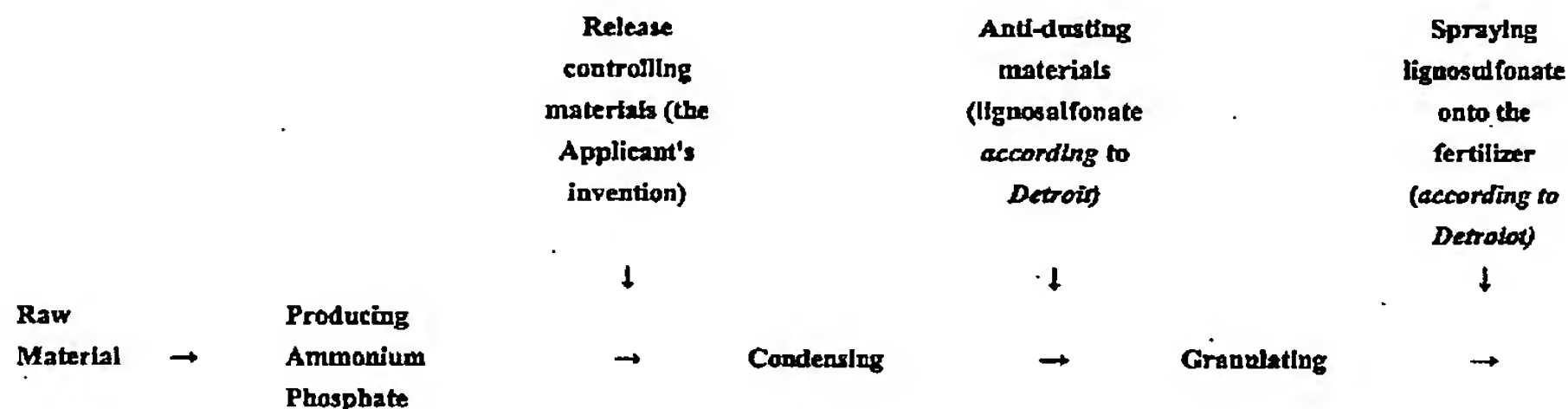
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- mixing evenly the ammonium, phosphate slurry and the release-controlling materials into a mixture;
- condensing the mixture of the ammonium phosphate slurry and the release-controlling materials until the water content of the mixture reaches 25-35% (w/w, based on the dry weight of the ammonium phosphate slurry); and
- granulating the condensed mixture of the ammonium phosphate slurry and the release-controlling materials to obtain granular controlled-release ammonium phosphate fertilizer.

The method according to the Applicant's invention is definitely different from that disclosed in Detroit (US 4846871 or 5041153) as shown in the following flow chart:



Detroit (US 4,846,871) is concerned with "LIGNOSULFONATE TREATED FERTILIZER PARTICLES," the objective of which is to improve the fertilizer's hardness, anti-caking and anti-dusting properties. Although it teaches adding up to 5wt% lignosulfonate to the fertilizer solution and then "prilling" the mixture (see col. 3, lines 10-70), it also teaches that the preferred range of added lignosulfonate to the fertilizer solution is between 0.3% and

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0.7% (see col. 3, line 9). The hardness of the fertilizer decreases presumably if the load of lignosulfonate is over 0.7% (see col. 3, line 10). That is, if the load of lignosulfonate is over 0.7%, it conflicts with the object of the present patent by improving the fertilizer's hardness. Thus, a person with ordinary skill in the art **will not** add over 0.7wt% lignosulfonate to the fertilizer solution after reviewing this patent.

Claims 6-12 of this patent are concerned with the method of treating a fertilizer to improve the fertilizer's hardness, anti-caking and anti-dusting properties. Claim 6 teaches the method of treating a fertilizer consisting essentially of the steps of:

- preparing an admixture of from 0.05% up to about 5.0% by weight of lignosulfonate...
- processing said admixture into a particulate form.

Claim 7 of this patent teaches the step of processing involves producing granules and the lignosulfonate is sprayed onto the fertilizer. That is, according to claims 6 and 7 of this patent, the steps of treating a fertilizer are

- preparing an admixture of a lignosulfonate and a fertilizer,
- (the lignosulfonate is added at this stage according to the Applicant's invention)
- producing granules, and

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- spraying the lignosulfonate onto the fertilizer. (The lignosulfonate is added in the last stage.)

Step 2 of the method according to the Applicant's invention is directed to evenly mixing the ammonium phosphate slurry (fertilizer solution) and the release controlling materials (lignosulfonate). The lignosulfonate is evenly mixed with the fertilizer solution prior to condensing the fertilizer mixture. Page 6, lines 5-7 according to the Applicant's invention teaches that these functional groups of the organic release-controlling materials (lignosulfonate) cause chemical bonding with NH_4^+ and H_2PO_4^- groups of the ammonium phosphate and also cause complexing with H_2PO_4^- . This chemical bonding is derived and strengthened from the even mixing and condensing of the organic release-controlling materials and fertilizer, and the controlled-release effect totally results from this chemical bonding. However, based on claims 6 and 7 of this patent, the lignosulfonate is sprayed onto the fertilizer. That is, the lignosulfonate is just coated onto the surface of the fertilizer granules. No essential chemical bonding is formed for the controlled released function between the lignosulfonate and the fertilizer granule expected from the disclosure of this patent because the lignosulfonate and the fertilizer are not evenly mixed and condensed. Thus, the fertilizer granules produced according to the method of this patent do not have the characteristic of being controlled release.

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From the disclosure of claim 8 and Example II of this patent, clearly the lignosulfonate is added after the step of condensing according to the Applicant's invention. However, the lignosulfonate (release-controlling material) in our patent is first evenly mixed with ammonium phosphate (fertilizer) solution, then condenses the water content rate to 25-35%. The Applicant's invention is clearly different in timing of adding and mixing lignosulfonate and the fertilizer from this US patent (the Applicant's invention is mixed before the condensing step, however, this patent is mixed after condensing step). No condensing step is required according to this US patent. Therefore, claims 1, 3, 5-7 1.0, 12 and 14 are allowable under 35 U.S.C. §102(b) over Detroit (US patent 4846871 or 5041153).

4. Claims 1, 3 5, 7 10, 12 and 14 are allowable under 35 U.S.C. 103(a) over US 5,360,465. The Applicant's invention relates to a method for making controlled-release ammonium phosphate fertilizer, which comprises 4 steps as mentioned above. The Examiner should examine the 4 step method as a whole, not the adding, mixing, condensing or granulating step individually. The Examiner should know that similar mixing, condensing or granulating steps also appears in other patents. The Examiner cannot reject the Applicant's invention just because it comprises these steps.

Lines 15+ in col. 3 of US 5,360,465 teach a method of producing fertilizer granules, comprising grinding ammonium

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phosphate to a fine powder, pre-wetting and mixing it with lignosulfonate in a high shear mixing device, then the mixture is granulated, dried and ground to the required size. Lines 9-14 in col. 4 teach "According to the method of the Applicant's invention, an effective dust reducing amount of an aqueous solution of a mixture of urea and lignosulfonate is applied, e.g., simply by spraying, to a granular, inorganic fertilizer." Thus, the aqueous solution of a mixture of urea and lignosulfonate is clearly sprayed onto the surface of the fertilizer granules according to this patent. That is, the timing of adding the aqueous solution of a mixture of urea and lignosulfonate to the fertilizer according to this patent is after the step of granulating. (The Applicant's invention is mixed before granulating.) Furthermore, only lignosulfonate is added as a controlled released material in the Applicant's invention, but "urea+ lignosulfonate" are together added in US 5860465. Thus, the Applicant's invention is quite different from that of the US patent. The aqueous solution of a mixture of urea and lignosulfonate is only sprayed on the surface of the fertilizer (the release controlling material of the Applicant's invention is mixing evenly with ammonium phosphate), and no essential chemical bonding between the lignosulfonate and the fertilizer is formed as is in the method according to the Applicant's invention. Thus, no controlled release characteristics can be obtained from this US patent. This effect

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was not obvious to a person having ordinary skill in the art at the time the Applicant's invention was made based on the disclosure US 5,360,465 and the well-known steps of grinding, mixing, etc. Therefore, the Applicant's invention should be granted a patent.

Further, the Applicant will emphasize that the step of condensing is different from that of drying. Condensing reduces the content of water/solvent to a certain level (25-35% as disclosed in the Applicant's invention), However, drying reduces the content of water/solvent to a very low level, i.e. below 3% or lower.

Line 10 on page 3 of this Official Action points out that "See col. 37-44 therefore" The Applicant is confused with this allegation because US 5,350,465 only has 8 columns in total. The Applicant cannot identify Col. 37-44 from this patent. This is apparently a typographic error. Please check it carefully again.

5. US pub. 2004/0099026 teaches a "Manufacturing Method for Zeolite Containing Fertilizer." Paragraph 0009 of this publication discloses that ... the zeolite component and the calcium carbonate component are mixed in a roughly 2:1 weight ratio (zeolite to calcium carbonate).. ... After drying the mixed slurry, these fertilizer precursor particles Paragraph 10 of this publication further discloses that when the precursor particles are applied to the field, they may be

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charged to become active, slow release fertilizer by the addition of commercial agricultural fertilizers. That is, the fertilizer precursor is applied to the field first, then the commercial fertilizers are applied to charge the fertilizer precursor to become active, slow release fertilizer. That zeolite cannot act independently is clear, and it only acts as a precursor. This characteristic of the US publication is different with the Applicant's invention, i.e. zeolite and ammonium phosphate fertilizer are mixed and reacted together before (not after) they are applied in field.

As stated in the last paragraph on page 3 of this Official Action, paragraph [0021] on page 2 and the claims of this publication teach that ammonium phosphate solution is added to a slurry of zeolite (10%) and dried. It is respectfully submitted that the Examiner must be misunderstanding the substantial content of this publication.

Paragraph [0021] doesn't disclose the fact that the final fertilizer particles are dried. Claim 3 of this publication discloses that the resultant mixed slurry is dried. The resultant mixed slurry is referred to claim 1, and contains particulate zeolite component and the particulate calcium, carbonate component. No commercial ammonium phosphate is mixed in the resultant mixed slurry. That is, if the fertilizer precursor is applied to the field first, then the commercial fertilizers are applied to charge the fertilizer precursor, the

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resultant mixed slurry (fertilizer precursor) is dried
(according to claim 3).

- If an application-ready fertilizer is produced, i.e. it contains commercial ammonium phosphate, zeolite, etc., no drying step is required, Therefore, the allegation that the Rohwer publication teaches that ammonium, phosphate solution is added to a slurry of zeolite (10%) **and dried** has no basis.

6. Young (US 3,354,096) relates to "Pelleted Zeolite Composition Possessing Improved Crushing Strength." Lines 57-64 in col. 3 state that

- According to a preferred embodiment of the invention, excess alumina is added to the composition. In this modification, the zeolite may be slurried or mulled in an aqueous alumina suspension or paste, to which is added the desired proportion of mono- or dihydrogen ammonium phosphate, or phosphoric acid. The resulting wet mixture is later dried, **pelleted and calcined** to decompose the ammonium ions . . .

That is, the wet mixture is then dried, **pelleted and calcined**, **not only "dried and pelleted"** as alleged by the Examiner. Those who have ordinary skill in the art know that the step of calcining will make the properties of the particles totally different. The Examiner cannot ignore the fact that the method disclosed in Young requires the step of calcining. If fact, the step of calcining in Young is required because it is concerned

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with a field of catalyst, not the fertilizer field as disclosed in the Applicant's invention. Therefore, those who have ordinary skill in the art cannot infer the fertilizer of the Applicant's invention in view of Young's patent about the field of catalyst.

7. RU 2165912 is directed to a "Method of Preparing Granular Nitrogen Phosphate Fertilizer." This method comprises preparing granular fertilizer based on neutralization of phosphoric acid or phosphoric and sulfuric acids with ammonia being carried out by feeding pulp into zeolite granulation and, drying apparatus (Detailed Description). This document attached to the Official Action concerning this patent is vague to the Applicant because its description is too simple to verify how many and what steps comprise this patent. The only description that relates to the method of the Applicant's invention is "Method of preparing granular fertilizer based on neutralization of phosphoric acid or phosphoric and sulfuric acids with ammonia is carried out by feeding pulp into zeolite granulation and drying apparatus." The only information disclosed in this description is that the mixture is dried and granulated as alleged by the Examiner (because of the granulation and drying apparatus). No steps of mixing evenly, condensing, etc. are disclosed, Specifically, this patent doesn't disclose how much zeolite is mixed in the mixture.

8. Berry et al. (US 4,695,387) relates to "Removal of Ammonia from Wastewater," not to a method of making controlled

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release ammonium phosphate fertilizer according to the Applicant's invention. Lines 48-50 in col. 3 of this patent teach that a pH between 4 and 6 is an ideal range of operation for the zeolite adsorbent for Removal of Ammonia from Wastewater. The adjusting of pH between 4 and 6 is to **make the zeolite adsorb ammonia more efficiently and to continuously keep balance to the added alkali**. That is, the interaction between the zeolite and ammonia is **physical adsorption**, not the allegation of the Examiner "where the ammonia and phosphoric acid are reacted." Lines 5-7 on page 6 of the Applicant's invention teach that these functional groups of the organic release controlling materials (lignosulfonate) cause **chemical bonding** with NH_4^+ and H_2PO_4^- groups of the ammonium phosphate and also cause **complexing** with H_2PO_4^- . Those who have ordinary skill in the art know that physical adsorption is totally different chemical bonding. Therefore, the disclosure of this patent gives no hint to the Applicant's invention. Furthermore, this patent relates to a process for the removal of ammonia from wastewater, not to fertilizer. How can a person in the field of treating wastewater infer the fertilizer in view of the fact that a pH between 4 and 6 is an ideal range of operation for the zeolite adsorbent.

9. CN 1163250 teaches "Zeolite ammonium phosphate synergist." This patent discloses that natural zeolite is **crushed, pelletized and mixed (not compounded, please check the**

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CN patent carefully. The abstract of English version of this patent is not translated correctly) with ammonium phosphate into zeolite ammonium phosphate, not "the zeolite is **crushed and mixed evenly with ammonium phosphate and pelletized.**" The order of the steps disclosed in this patent is "**crushed, "pelletized" and "mixed"** not "**crushed, "mixed" and "pelletized.**" This order is critical and important to the Applicant's invention. If the fertilizer according to CN1163250 is pelletized first, then the zeolite in the mixture only has a small chance to contact ammonium phosphate, thus cannot form essential chemical bonding between the zeolite and ammonium phosphate to produce the release controlled fertilizer. Because the surfaces of the fertilizer granules and zeolite granules are much less than those in powder form, the fertilizer granules have no essential controlled release effect as disclosed in the Applicant's invention.

The Applicant's invention relates to a method for making controlled release ammonium phosphate fertilizer, which comprises the steps of:

- **adding** release controlling materials to ammonium phosphate slurry;
- **mixing evenly** the ammonium phosphate slurry and the release controlling materials into a mixture;
- **condensing** the mixture of the ammonium phosphate slurry and the releasecontrolling materials until the water content of

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the mixture reaches 25-35% (w/w, based on the dry weight of the ammonium phosphate slurry); and

- granulating the condensed mixture of the ammonium phosphate slurry and the release controlling materials to obtain granular controlled release ammonium phosphate fertilizer.

In view of the disclosure of Rohwer, RU 2165912, Berry et al, and CN 1163250, those who have ordinary skill in the art cannot infer the method of the Applicant's invention having the steps in the following order:

Adding → Mixing evenly → Condensing → Granulating,
and make the controlled-release ammonium phosphate fertilizer.
That is, claims 1-15 of the Applicant's invention are patentable under 35 U.S.C. 103(a).

10. The second Paragraph on Page 5 of this Official Action alleges that "The language 'comprising' of the claims does not exclude the other ingredients." This statement is not correct because the Applicant's invention is directed to a method comprising certain steps, not to a material or formulation. If the Applicant's invention is directed to a material comprising certain ingredients, it doesn't definitely exclude other ingredients. However, the Applicant's invention is directed to a method for making controlled release ammonium phosphate fertilizer, thus the other ingredients, for example urea, are definitely excluded.

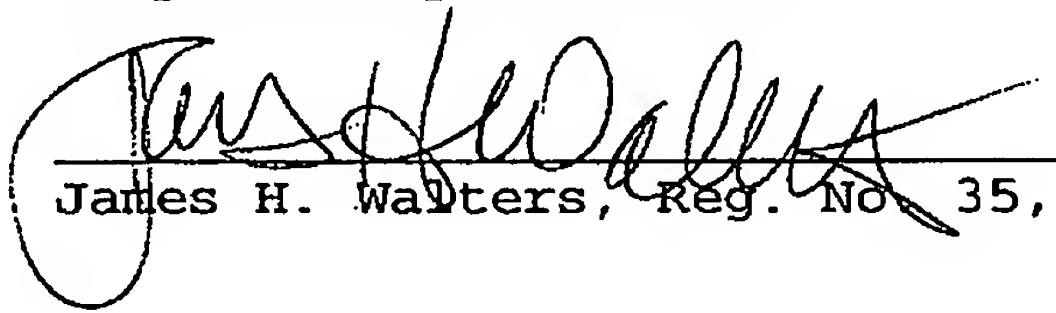
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11. The third Paragraph on Page 5 of this Official Action states that "by virtue of the same materials being present and the steps having been met, this Feature would have been inherent." However, as discussed in point 3 above, the product made by Detroit is different from that of the Applicant's invention, and the steps used in Detroit are not the same as those applied in the Applicant's invention, either. Thus, the Examiner's allegation "this feature would have been inherent" is not persuasive.

It is therefore respectfully submitted that claims 1-4 and 7-15 are not taught or suggested by the documents, whether considered alone or when combined.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicant's attorney at 503-224-0115 if there are any questions.

Respectfully submitted,


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